King County

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Design specifications for International Residential Code Section M1507.3.4 and International Mechanical Code Section 403.8.6 for the whole house ventilation system using exhaust fan system serving residences of 4 stories of less.

Outdoor air shall be supplied to each habitable space at flow rates calculated per IRC Section M1507.3.3, IMC Section 403.3 through exhaust fan system using the following method:

A. ROOM FRESH AIR INLETS SHALL COMPLY WITH THE FOLLOWING:

1. Have controllable, secure openings, and be sleeved or designed so as not to compromise the thermal properties of the wall or window in which they are placed.
2. Openings shall be screened or protected to prevent entry of insects, leaves, or other materials.
3. Provide a minimum of four square inches of net free area of opening for each 10 cfm of outdoor air required in IRC Table M1507.3.3(1), IMC Table 403.8.1. Any inlet or combination of inlets which provide 10 cfm @ 10 Pascals are deemed equivalent to 4 square inches.
4. Air inlets shall be located so as not to receive fresh air from the following areas:
   a) Within ten feet of an appliance vent outlet, unless the vent outlet is three feet above the fresh air inlet.
   b) Where it will pick up objectionable odors, fumes, or flammable vapors.
   c) A hazardous or unsanitary location.
   d) A room or space having any fuel burning appliances therein.
   e) Closer than 10’ from a vent opening of a plumbing drainage system unless the vent opening is at least three feet above the air inlet.
   f) Attics, crawl spaces, or garages.
   g) Asphalt roofs unless it is shown that no other location is permissible and opening is located at least two feet above nearest asphalt surface.

B. WHOLE HOUSE EXHAUST FANS SHALL:

1. Be sized according to IRC Table M1507.3.3(1), IMC Table 403.8.1.
2. Flow rated at 0.25” W.G. static pressure.
3. Sound rated at 1.0 sones maximum measured at 0.1” W.G.. Fans with sone rating greater than 1.0 shall be in-line duct fan installed at least 48 inches from interior intake grille.

2015 EXHAUST FAN(S)

VENTILATION AND INDOOR AIR QUALITY REQUIREMENTS

2015 International Residential Code Section 1507.3.4
2015 International Mechanical Code Section 403.8.6

USING EXHAUST FAN SYSTEM

4. Remotely located fans shall be acoustically isolated from structural elements and from attached ductwork using insulated flexible duct or other approved method.

C. WHOLE HOUSE EXHAUST FAN CONTROLS SHALL:

1. Be controlled by a readily accessible 24-hour clock timer.
2. Provide capability of continuous operation or intermittent operation complying with IRC M1507.3.2, manual and automatic control.
3. Intermittent operation shall be at least one hour out of every four hours of the day.
4. Be capable of operating exhaust fans without energizing other energy consuming appliances.
5. At the time of final inspection, the automatic control timer shall be set to operate the whole house fan according to the schedule used to calculate the whole-house fan sizing.

NOTE: A label shall be affixed to the control that reads *“Whole House Ventilation (see operating instructions)”*. Installers shall provide the manufacturer’s installation, operation instructions, and a whole house ventilation system operation description.

D. WHOLE HOUSE EXHAUST DUCTS:

1. Be sized according to IMC Table 403.8.5.2.
2. Insulated to a minimum R-4 in unconditioned spaces, and sealed per IRC Section 1601.4.1.
3. Terminate outside the building.
4. Be equipped with a back-draft damper.

C. FRESH AIR DISTRIBUTION:

Outdoor air shall be distributed to each habitable room by individual fresh air inlets or operable windows. Provisions shall be made to ensure airflow by the installation of distribution ducts, transoms, grilles, or undercutting doors a minimum of 1/2 inch above the finished floor coverings. See specific requirements for outdoor air inlets specified in IRC Section M1507.3.4.4, IMC Section 403.8.6.1.

D. VENTILATION SYSTEM TESTING:

At the discretion of the building official, flow testing may be required to verify that the fan system satisfies the requirements of IRC section M1507.3.4, IMC Section 403.8.6.

LOCAL EXHAUST VENTILATION REQUIREMENTS

1. EXHAUST FAN REQUIREMENTS (IRC Table M1507.4, IMC Table 403.3):

a) Bathrooms, laundries, and powder rooms: 50 CFM @ 0.25" W.G., or 20 cfm continuously.

a) Kitchens: 100 CFM @ 0.25" W.G. Range hoods and down draft ranges shall be rated not less than 100 CFM @ 0.10" W.G., or 25 cfm continuously.

b) Shall be controlled by readily accessible manual switches, dehumidistats, timers, or other approved means.

2. EXHAUST DUCT REQUIREMENTS:

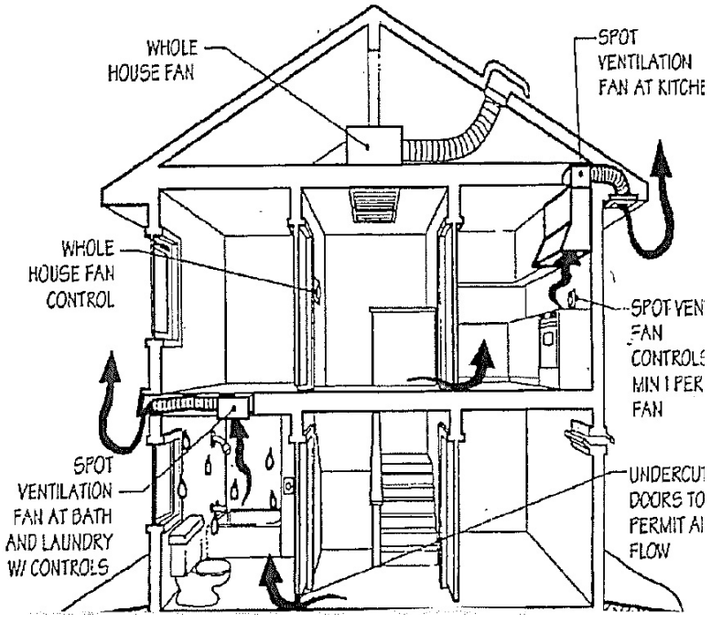
a) Be insulated to a minimum R-4 in unconditioned spaces.

b) Be equipped with a backdraft damper.

c) Terminate outside the building.

d) Comply with IRC Section M1601, IMC Section 603.

NOTE: *All manufacturer's fan flow ratings shall be determined as per HVI 916 (April 1995) or AMCA 210*



Minimum Ventilation Rates*

(continuously operating systems)

IRC Table M1507.3.3(1) / IMC Table 403.8.1

Floor Area (sq. ft.)	Number of Bedrooms				
	0 - 1	2 - 3	4 - 5	6 - 7	> 7
< 1500	30	45	60	75	90
1501 – 3000	45	60	75	90	105
3001 – 4500	60	75	90	105	120
4501 – 6000	75	90	105	120	135
6001 – 7500	90	105	120	135	150
> 7500	105	120	135	150	165

*Minimum outdoor airflow rates measured in cfm.
Outdoor Air Flow Rate = Ventilation Rate Requirement multiplied by Ventilation Rate Factor

Intermittent Ventilation Rate Factors

IRCTable M1507.3.3(2) / IMC Table 403.8.5.1

Run-time % in each 4 hour Period	Ventilation Rate Factor
25% (1 hr every 4 hrs; 6 hrs per day)	4
33% (1 hr 20 min per 4 hrs; 8 hrs daily)	3
50% (2 hrs every 4 hrs; 12 hrs per day)	2
66% (2 hrs 40 min every 4 hrs; 16 hrs per day)	1.5
75% (3 hr every 4 hrs; 18 hrs per day)	1.3
100% (Continuously operating)	1.0

For systems designed to operate between given Run-time, Ventilation rate factors may be interpolated.

Minimum Required Exhaust Rates

IRC Table M1507.4

Area to be Vented	Ventilation Rates
Kitchens	100 cfm intermittent or 25 cfm continuously
Bathrooms / Laundry / Pools and Spas / Similar areas	50 cfm intermittent or 20 cfm continuously

Prescriptive Supply Fan Duct Sizing

IRC Table M1507.3.6.2 / IMC Table 403.8.5.2

Supply Fan Tested CFM @ 0.40 w.g.		
Specified Volume from Table 408.1	**Minimum Smooth Duct Diameter**	**Minimum Flexible Duct Diameter**
50 – 90 cfm	4 inch	5 inch
90 – 150 cfm	5 inch	6 inch
150 – 120 cfm	6 inch	7 inch
250 – 400 cfm	7 inch	8 inch

Prescriptive Exhaust Duct Sizing

IMC Table 403.8.4.2

Fan Tested cfm @ 0.25" w.g.	Minimum Flex Diameter	Maximum Length	Minimum Smooth Diameter	Maximum Length	Maximum Elbows[1]
50	4 inches	25 ft.	4 inches	25 ft.	3
50	5 inches	25 ft.	5 inches	25 ft.	3
50	6 inches	No Limit	6 inches	No Limit	3
80	4 inches[2]	N/A	4 inches	25 ft.	3
80	5 inches	25 ft.	5 inches	25 ft.	3
80	6 inches	25 ft.	6 inches	No Limit	3
100	5 inches[2]	N/A	5 inches	25 ft.	3
100	6 inches	25 ft.	6 inches	No Limit	3
125	6 inches	25 ft.	6 inches	No Limit	3
125	7 inches	25 ft.	7 inches	No Limit	3

Footnotes:

1. For each additional elbow, subtract 10 feet from length.
2. Flex ducts of this diameter are not permitted with fans of this size.